

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:)
Norio Matsumoto et al.) Examiner: Matthew J. Daniels
)
Title: METHOD AND APPARATUS FOR) Art Unit: 1732
FORMING A HOLLOW FRP ARTICLE)
BY INTERNAL PRESSURE MOLDING) Confirmation No.: 9819
)
Serial No.: 10/811,023)
)
Filed On: March 26, 2004) (Our Docket No: 4415-0024)

Hartford, Connecticut, February 5, 2008

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Dear Sir:

The Applicant respectfully requests review of the final rejection in the above-identified application, in light of the following remarks. This request is being filed with a Notice of Appeal. Applicant expressly reserves any grounds for appeal not addressed in the limited space available for the present submission.

REMARKS appear on pages 2-6, and are no more than five pages total.

REMARKS

Claims 1-5 are pending. Claims 1-5 have been rejected. Claim 1 is the only independent claim.

Claims 1-5 are rejected under 35 USC § 103(a) as being unpatentable over US Patent No. 6,352,662 to Murphy et al. (Murphy) in view of US Patent No. 6,299,810 to Blackinton, Jr. et al. (Blackinton).

There are four (4) clear errors of fact or application of law to which review is requested. First, the facts in Blackinton have been mischaracterized. Second, the Final Office Action failed to establish a *prima facie* case of obviousness because all of the claim elements in the pending application were not suggested or disclosed by the prior art. Third, the Final Office Action failed to adequately explain how the prior art would be combined. Fourth, there was no motivation to combine the references.

The present invention is drawn to a method for forming a hollow fiber reinforced plastic (FRP) article, such as a golf club shaft, by internal pressure molding. Specifically, claim 1 recites:

1. A method for forming a hollow FRP article by internal pressure molding, comprising: positioning a FRP prepreg on a periphery of an airtight internal-pressure holding tube; inserting a composite body including said internal-pressure holding tube and said prepreg into a vacuum chamber containing a forming die; evacuating said vacuum chamber in an isolation state **where said composite body and said forming die do not contact each other**; and clamping said forming die to bring said forming die and said composite body into contact with each other and heating said forming die with an application of pressure to an inside of said internal-pressure holding tube after completion of said evacuating step.

The primary purpose of the invention is to eliminate pits and dimples on a surface of the molded hollow article (Patent Application at Para. 0007). The step “where the composite body and the forming die do not contact each other” during the vacuum cycle is necessary to achieve satisfactory surface smoothness and uniformity, and overcomes the problems with prior art processes.

Murphy teaches a method and apparatus to internally mold a golf club shaft, but does not disclose a vacuum cycle. Therefore, one must turn to Blackinton for any teaching with regards to a vacuum cycle.

Blackinton teaches an apparatus and method to mold composite planks, for which a smooth, uniform surface is apparently unimportant. The Blackinton process includes a vacuum cycle prior to a compression cycle. Blackinton discloses several embodiments for forming composite planks, and all of them show or describe placing the composite on a tray during the vacuum cycle. In one embodiment referred to in the Office Actions, a composite weave is wrapped around a mandrel and then enclosed in a plastic vacuum bag. The mandrel, composite, and bag are then placed on a tray, the tray slid into a vacuum chamber, and a vacuum is pulled on both the chamber and the bag, causing the bag "to float above the carbon fiber weave" as air pockets and the like are drawn out of the weave (Col. 19, Lines 26-34). After the vacuum cycle, a compression cycle is conducted wherein the chamber is pressurized while maintaining a vacuum in the bag. The resultant pressure differential causes the plastic bag to collapse and exert between 15 psi to approximately 65 psi pressure on the composite weave.

The first error of fact or application of law to which Applicants request review is the characterization that the vacuum bag in Blackinton is a forming die. In the Non-Final Office Action of 2/12/2007 at page 3, the Examiner asserts the Blackinton process includes "providing a mandrel, a vacuum chamber and a **pressing die** (forming die), wrapping a plurality of pre-preg fibers about said mandrel to form an assembly, placing said assembly in a vacuum bag, drawing a vacuum onto said vacuum bag and said vacuum chamber such that the bag is kept off the fibers (composite body and **forming die** do not contact each other), collapsing said vacuum bag and, applying heat and pressure using **said pressing die to form** said fiber reinforced article." The factual error is that the embodiment to which the Examiner refers does not have a forming die. The plastic bag is described as nylon or polyethylene (Col. 19, Line 14), thus providing no rigidity, shape, or uniformity. As acknowledged by the Examiner in the Final Office Action of 8/6/2007 at page 6, the vacuum bag is "deformable," meaning it cannot provide the forming function, as required by claim 1. Therefore, it is error

in fact to assert Blackinton teaches a forming die that is not in contact with the composite during the vacuum cycle. Note that in all other embodiments disclosed by Blackinton, the forming die undisputedly contacts the composite article.

The second error of fact or application of law to which Applicant seeks review is that the Final Office Action failed to establish a *prima facie* case of obviousness. In order to establish a *prima facie* case of obviousness, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. *KSR International Co. v. Teleflex*, 127 S. Ct. 1727, 1734, citing *Graham v. John Deere Co*, 86 S. Ct. 684.

In ascertaining the differences between the claimed invention and the prior art, the Examiner asserted that the combination of Murphy and Blackinton teach the claim limitation “where the composite body and the forming die do not contact each other” during the vacuum cycle. To the contrary, all of the embodiments in Blackinton and Murphy teach that there is contact between the composite body and the forming die. In the particular embodiment with the plastic vacuum bag, the composite is wrapped in the bag and placed on a tray during the vacuum cycle. The vacuum bag necessarily contacts the composite body on the underside, where it is supported by the sliding tray. As the Examiner conceded, “Blackinton does appear to provide something under the bag in Fig. 8B.” Final Office Action at page 6. By the Examiner’s own admission then, Blackinton teaches *at best* a portion of the composite body not in contact with the forming die. That is not what is claimed, so all the limitations of claim 1 have not been suggested or disclosed by the prior art.

To overcome this deficiency, the Examiner stated one of ordinary skill “would have been motivated to provide supports” such that the entire bag is kept off the composite (Final Office Action at page 6). This is a conclusory statement with no rational underpinning in Murphy or Blackinton, and is insufficient grounds for an obviousness rejection. *KSR International Co. v. Teleflex*, at 1741. Because the Final Office Action did not articulate any valid reasons one

of ordinary skill in the art would have been motivated to select the references and combine them, a *prima facie* case of obviousness has not been established.

The third error of fact or application of law to which Applicant seeks review is that the Final Office Action failed to explain how the prior art would be combined. Referring to the subject application, claim 1 requires a composite body be inserted into a vacuum chamber containing a forming die. Page 6 of the Final Office Action states “the bag of Blackinton and mold of Murphy provide a shaping and molding function, and are therefore interchangeable.” This is an error of fact. The plastic “deformable” bag of Blackinton cannot shape or mold a composite article, and therefore cannot be interchanged with a forming die. This is particularly evident when examining claim 1 in its entirety, wherein the hollow FRP article is pressurized from the inside, and the forming die, being clamped to the outside, shapes the article. Clearly, the bag of Blackinton could not provide this function.

Given these facts, the only plausible combination Applicants can deduce is to combine the forming die of Murphy with the vacuum bag of Blackinton. The Final Office Action alludes to this combination at page 6, stating “a reasonable expectation of success would be implicit in that Murphy teaches and requires a mold, Blackinton provides a deformable mold, and the combination would provide the predictable result of ...” However, this combination would render the golf club shaft of Murphy unsatisfactory for its intended purpose. The Examiner’s combination necessitates placing the vacuum bag between the forming die and the composite article during the molding step, which would emboss any wrinkles or deformities in the bag onto the surface of the golf club shaft, in direct contradiction to the object of the invention stated in Para. 0007. Therefore, it is clear error to reject the subject claims under 35 USC § 103(a) because the Final Office Action fails to explain how the prior art would be combined.

The fourth error of fact or application of law to which Applicant seeks review is that there would be no motivation to combine the Murphy and Blackinton references because the resultant article would have an unsatisfactory surface finish, in contravention of the problem to be solved by the present

invention. As stated above, Murphy does not mention any manner of a vacuum cycle, therefore one must turn solely to Blackinton for guidance. Blackinton teaches a vacuum cycle, but the disclosed method is said to create peaks, valleys, and a rough surface that need to be ground down and planed to be removed (Col. 11, Lines 16-33, and Col. 19, Line 60). In contrast, the vacuum cycle and molding cycle of the present invention are intended to create a smooth finish. No further process steps are required.

Further, the Blackinton reference teaches away from the claimed invention because the amount of material Blackinton removed to establish a satisfactory surface finish is greater than the total thickness of an ordinary golf club shaft. According to Blackinton, 0.335 inches of material was planed from the top of the work piece and 0.165 inches was planed from the bottom to achieve a satisfactory surface finish. Notably, twice as much material was removed from the surface where the bag was floating than the surface that was in contact with the bag. Thus, no benefit to surface condition could reasonably be expected using the Blackinton vacuum cycle. It is clear error to assert one would be motivated to combine the vacuum cycle of Blackinton with the internal pressure molding process of Murphy.

In light of the above, it is respectfully submitted that there are at least four (4) clear errors of fact or application of law with regards to the rejection of claims 1-5 under 35 USC § 103(a). Accordingly, Applicants hereby request reconsideration of the Final Office Action.

Respectfully submitted,

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